

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE

		127FM01		
FILTER, COOLANT LOOP, ITEM 127 ----- SV778543-3 (1)	2/2	Contamination breakthrough.	END ITEM: Contaminants released to downstream components.	A. Design - (P/N SV778543): 1) Filter is changed prior to every flight. Pressure across screen normally is small. (0.15 psid). There are screen supports built into item housing every 0.260 inch. 2) The strength of screen material is 20,000 psi yield and the material can handle a 34 psi delta P.
OR ----- SV805180-1 (1)		SV778543-3: Defective attachment of the filter screen to the housing. Cartridge seal bypass leakage. Screen rupture. SV805180-1: Defective attachment of the filter screens and support screens to the housing. Cartridge seal bypass leakage. Filter and support screen rupture.	GFE INTERFACE: Particles migrate into pump. Possible pump binding, resulting in a loss of coolant flow to the LCVG and to the sublimator. MISSION: Terminate EVA due to loss of LCVG cooling. CREW/VEHICLE: None. Crewman discomfort. (hot)	3) The screen material is a stainless steel screen, is a square weave, .0008 diameter wire and a 635x635 wire mesh. 4) The seals associated with sealing this item into its housing are viton material seals. (P/N SV805180): 1) The radial flow filter design employs two cylindrical filter screens, each supported by a coarse mesh screen. 2) The filters are supported by stainless steel screens, .009 diameter wire and 50 x 50 wire mesh. The strength of the support screen material is 25,000 psi yield and the material can handle a 400 psi delta P. Pressure across the screens normally is small. (0.15 psid). 3) The filter screen material is a stainless steel screen, twilled square weave, .0008 diameter wire and a 635 x 635 wire mesh. 4) The bypass flow seal is a viton material. 5) The filter is changed every 328 hours.
				B. Test - (P/N SV778543 and P/N SV805180): Component Acceptance Test - None. (P/N SV778543 and P/N SV805180): PDA Test - None.
			TIME TO EFFECT /ACTIONS: Minutes.	(P/N SV778543): Certification Test - Certified for a useful life of 15 years or 328 hours. (ref. EMUM-583, EMUM-680).
			TIME AVAILABLE: Minutes.	C. Inspection - (P/N SV778543): Cause - Defective attachment of the filter screen to the housing.
			TIME REQUIRED: Seconds.	A weld sample is processed with the production parts and is destructively tested to verify a proper weld. The production parts are 100% visually inspected for proper placement of the resistance welds and the band material.
		REDUNDANCY SCREENS: A-N/A B-N/A C-N/A		A bubble point test is performed to check for any gaps larger than the weave of the screen. (P/N SV805180): Cause - Defective attachment of the filter or support screen to the housing. Two screen weld samples are destructively tested to establish proper weld schedule. In addition, one weld sample is processed prior to welding the first production piece, and another at the completion of a production lot. Both samples are destructively tested to verify proper weld. The production parts

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
		127FM01		<p>are 100% visually inspected at a minimum of 25X magnification for proper placement of the resistance welds at each level of assembly. A bubble point test is performed to check for any gaps larger than the weave of the screen.</p> <p>(P/N SV778543 and P/N SV805180):</p> <p>Cause - Cartridge seal bypass leakage. The filter housing and valve housing sealing interfaces are 100% inspected to meet dimensional and surface finish requirements. The O-seal is 100% inspected to meet dimensional and surface finish requirements.</p> <p>Cause - Screen rupture. A bubble point test is performed to check for any gaps larger than the weave of the screen.</p> <p>D. Failure History - P/N SV778543: None. P/N SV805180: H-EMU-127-D001 (6/10/92) - Three enhanced gas trap filters exhibited bubbles at bubble point pressures below the specification minimum of 8.9 inches of water. Testing at the vendor (Mectron) in Denatured Ethanol instead of ARP 901 specified Isopropyl Alcohol showed a false high bubble point pressure due to the high surface tension of the Ethanol. The vendor procedures have been corrected to use IPA as a test fluid and properly inspect all screens and welds for bubble point performance.</p> <p>E. Ground Turnaround - (P/N SV778543): Filter is changed out during pre-flight processing for non-EET processing per FEMU-R-001. Also, tested per FEMU-R-001, Fan/Pump/Separator/Vent Flow Sensor Performance. None for EET processing.</p> <p>(P/N SV805180): The filter is changed out every 328 hours. Also, tested per FEMU-R-001, Fan/Pump/Separator/Vent Flow Sensor Performance.</p> <p>F. Operational Use - (P/N SV778543 and P/N SV805180): Crew Response - PreEVA: Trouble shoot problem If no success, consider third EMU if available, otherwise continue with EVA prep. EVA: If cooling becomes a problem, diminish level of activity and try to stay away from direct sunlight. If cooling is still inadequate, terminate EVA. Training - Standard training covers this failure mode. Operational Considerations - RTDS allows ground monitoring of EMU systems. EVA check list procedures verify hardware integrity and systems operational status to EVA. Flight rules define EMU as go to remain on SCU (available for rescue if required). Flight rules define loss of EMU for loss of thermal control.</p>

EXTRAVEHICULAR MOBILITY UNIT
SYSTEMS SAFETY REVIEW PANEL REVIEW
FOR THE
I-127 PUMP INLET FILTER
CRITICAL ITEM LIST (CIL)
EMU CONTRACT NO. NAS 9-97150

Prepared by: *J. Alaman* 3/27/02
HS - Project Engineering

Approved by: *RMB* 04/30/02
~~NASA - SSM~~
ES

M. Snyder
HS - Reliability

L. Elbert
NASA - EMU/SSM

Alan H. Pough for RMC
HS - Engineering Manager

J. F. ...
NASA - S & MA

J. ...
NASA - MOD

J. ...
NASA - Crew

J. ...
NASA - Program Manager